UNITED STATES PATENT AND TRADEMARK OFFICE

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EXAMINER
PORTKA, GARY J

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _10 March 2009_.
2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-75_ is/are pending in the application.
     4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☒ Claim(s) _1-15 and 30-33_ is/are allowed.
6)☒ Claim(s) _16-29 and 34-75_ is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
     a)☐ All   b)☐ Some * c)☐ None of:
       1.☐ Certified copies of the priority documents have been received.
       2.☐ Certified copies of the priority documents have been received in Application No. _____.
       3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
     * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1.   A request for continued examination under 37 CFR 1.114, including the fee set

forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this

application is eligible for continued examination under 37 CFR 1.114, and the fee set

forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action

has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March

10, 2009 has been entered.

2.   Claims 1, 16, 28, 34, 39, 41, 44, 49, 54, 69 and 71 have been amended, and

claims 73-75 have been added by Applicant. Claims 1-75 are pending.

Response to Arguments

3.   Applicant's arguments submitted on March 10, 2009, have been fully considered

but are partly not persuasive. Applicants argue that Permut teaches only a fixed

number used for prefetching. Examiner disagrees since the sections cited hereinbelow

specifically state that the field used for indication of prefetch amount is updated.

Applicants also argue that Permut does not modify an existing readahead hint, but

rather generates an entirely new hint. Examiner disagrees again based on the

immediately preceeding response, that Permut specifically updates the prefetch field.

Arguments regarding association of readahead hints with particular read steams are

largely not completely supported by the claim language. It would appear to be inherent

(if not explicitly disclosed) that any computer system running a program contains a read

stream of commands to read data, as defined by Applicant. Thus any readahead hints

would be associated with that particular read steam, as recited in many claims. That is,

many of the claims appear to basically recite multiple read commands, where a

readahead hint is modified with a subsequent command.

Claim Objections

4.   Claims 16, 28 and 34 are objected to because of the following informalities:

Claim 16 recites "means for receiving a first data read command" and "means for

receiving a client read request", and "means for receiving a next client read request". It

appears that these may refer to a single means, the means for receiving the

request/command; are there three separate means as claimed (please cite support)?

Claim 28 recites at line 12 "plurality of factors for a particular read steam based on a

plurality of factors", which appears to be circular. Claim 34 recites at line 13 "modifying

on or more", which appears to be a typo intending the language "one or more".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5.   The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of
> making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the
> art to which it pertains, or with which it is most nearly connected, to make and use the same and shall
> set forth the best mode contemplated by the inventor of carrying out his invention.

6.   Claims 71-72 are rejected under 35 U.S.C. 112, first paragraph, as failing to

comply with the enablement requirement. The claim(s) contains subject matter which

was not described in the specification in such a way as to enable one skilled in the art to

which it pertains, or with which it is most nearly connected, to make and/or use the

invention. Claim 71 recites "operating system to establish a read stream corresponding

to each readset data structure". This appears to signify a cause-and-effect relationship

in which readset data structures are set or defined, then afterwards read streams are

established to correspond to the data structures (support?). This will be interpreted as

reading on any correspondence between the structures and the streams. Claim 72

incorporates this limitation by dependency.

Claim Rejections - 35 USC § 102

7.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8.   Claims 16-29 and 34-75 are rejected under 35 U.S.C. 102(b) as being

anticipated by Permut et al. (US Patent # 6,260,115), herein Permut.

9.   As to claims 16, 22, 28, 34, 39, 41, 44, 49, 69 and 71, Permut discloses *an*

apparatus configured to, media containing instructions for, storage system that, and

method to implement a storage operating system that optimizes an amount of

readahead data retrieved from a data container of the apparatus, comprising: means for

receiving a first data read command associated with a particular read stream (inherently

via a network adaptor for disk storage systems such as in Permut), *the stream a set of*

client read commands to retrieve data from a contiguous range of file offsets with a

requested file (Abstract, Fig. 7A, 700, col. 1 lines 11-15, any host requests may be

considered part of a read stream as defined, for a contiguous range of offsets since any

data accessed may be considered part of a file, and offset into the file; also Permut

provides multiple streams for a single logical unit, col. 2 lines 31-37, the logical unit may

be considered as any desired unit, col. 8 lines 50-52, thus a file as recited), *means for*

maintaining, for a selected file, a plurality of readset data structures (seen as entries

210, see Fig. 2, col. 5 lines 59-67, col. 6 lines 22-37), *each holding a plurality of factors*

for a stream (any possible entries in 210), *the factors allowing the system to adjust*

adaptively the amount of data retrieved from the container (as described and cited

below), *means for receiving a client read request associated with the particular stream*

and means for determining an amount of readahead data to retrieve (host prestaging

hints in part, col. 3 line 66 to col. 4 line 3, col. 8 lines 59-67, col. 10 lines 47-59, which

are used in entering data into 210, col. 11 lines 2-15, col. 12 lines 8-12), *means for*

receiving a next client read request associated with the stream (as the first request

was), *means for locating a readset data structure for the particular stream* (since the

related entry 200 containing filed 210 is located), *means for adjusting an amount of*

readahead data to retrieve from the container based on modifying the factors stored in

the data structure, the adjusted amount different than an amount retrieved from the

client read request, means for retrieving the adjusted amount of readahead data (see

col. 11 lines 2-15, col. 12 lines 34-42, and col. 13 lines 7-11, note also Figs. 7A-7C,

where prestage number is set at 718, 731, and 744, and "updated" at 784), *and means*

for determining if the readset data structure meets a criteria for being updated, and if so

then updating it (by the decisions as shown in Figs. 7A-7C to execute step 784).

10.   As to claims 54 and 55, Permut discloses the method substantially as described

above; *readahead data is cached for each read stream* is also disclosed (recognizable

to an artisan as equal to prestaging).

11.   As to claims 73-75, Permut discloses the method substantially as described

above, *determining one or more input parameters* which are used to establish the

readahead hint is disclosed, seen as the prefetch hints of the commands (col. 8 lines

59-60).

12.   As to claims 17, 23, 29, 43, and 56, Permut further discloses *wherein the data*

container is a file, directory, vdisk or lun (col. 1, lines 12-33, col. 2, lines 29-48).

13.   As to claims 18, 24, and 57, Permut further discloses *wherein the storage*

operating system is determined to be permitted to retrieve readahead data from the

data container when the client-requested data extends the read stream past a

predetermined next readahead value (Fig. 7B, 722, 732, 734 & col. 11, lines 38-48).

14.   As to claims 19, 25, and 59, Permut further discloses *wherein the predetermined*

next readahead value is updated based on a percentage of the selected amount of

readahead data (Fig. 7B, 740, 742, 744 & col. 11, line 60 – col. 12,line 12).

15.   As to claims 20 and 26, Permut further discloses *wherein the plurality of factors*

used to select the amount of readahead data includes at least one of: (i) the amount of

client-requested data (col. 5 lines 1-6), *(ii) a number of client read requests processed in*

the read stream (col. 4 lines 53-67), *and (iii) a read-access style associated with the*

data container (Fig. 2, 206, col. 4 lines 30-39).

16.   As to claim 21, Permut further discloses *wherein the selected amount of readahead data is doubled if the number of client read requests processed in the read stream is greater than a first threshold value* (col. 10 lines 47-59).

17.   As to claims 27, 35, 36, and 66, Permut further discloses *wherein the selected amount of readahead data is doubled if the number of client read requests processed in the read stream is greater than a first threshold value* (col. 10 lines 47-59).

18.   As to claim 37, Permut further discloses the method of claim 36, further comprising the step of rounding, the selected amount of readahead data to the size of a data block (col. 1 lines 55-59). Permut teaches prestaging whole data blocks, which would inherently require a rounding step to achieve such prestaging.

19.   As to claim 64, Permut further discloses *wherein the amount of client-requested data is one of the plurality of factors used to select the amount of readahead data* (col. 5, lines 1-6).

20.   As to claims 38, and 65, Permut further discloses *wherein the selected amount of readahead data is set equal to a predetermined upper limit for large amounts of client-requested data* (col. 4 lines 7-21).

21.   As to claim 60, Permut further discloses *wherein a read-access style associated with the data container is one of the plurality of factors used to select the amount of readahead data* (Fig. 2, 206 & col. 4, lines 30-39).

22.   As to claim 40, and 61, Permut further discloses *wherein the selected amount of*

readahead data equals zero if the read-access style corresponds to a random read-

access style (col. 2, lines 51-66, col. 4, lines 40-52 & col. 6, lines 16-47).

23.   As to claim 42, Permut further discloses *wherein the step of selecting an amount*

of readahead data further comprises: determining whether a flag is associated with the

read stream (Fig. 2, 202), *the flag indicating that the storage system is associated with*

more than a predetermined number of storage devices (col. 9 line 46); *and in response*

to determining whether the flag is associated, selecting the amount of readahead data

(col. 9 lines 43-56; Permut sets the Flags 202 to active/inactive depending on whether

the entry is referenced by the storage systems and is functionally equivalent to the flags

claimed by Applicant).

24.   As to claims 45, 47, 48, 50, 52, 53, and 68, Permut further discloses *wherein the*

selected amount of readahead data is stored in one or more buffers enqueued on a

flush queue, the flush queue being configured to reuse buffers after a predetermined

period of time (col. 3 lines 11-30, col. 5 lines 15-18).

25.   As to claims 46, 51, and 67, Permut further discloses *wherein the client-*

requested data is identified as read-once data when either (i) the number of client read

requests processed in the read stream is greater than a second threshold value (Fig. 2,

208, col. 4 lines 6-21) *or (ii) a set of metadata associated with the read stream indicates*

that the client-requested data is read-once data (Fig. 2, 206, col. 11 lines 38-48; an

entry's position on a candidate list, as disclosed by Permut, is functionally equivalent to

"metadata" claimed by applicant because they both identify read-once data requested

from a client).

26.   As to claim 58, Permut further discloses *wherein the predetermined next*

readahead value is stored in a readset data structure associated with the read stream

(Fig. 2, 200, 204, 210 & col. 11, lines 38-48).

27.   As to claim 62, Permut further discloses *wherein a number of client read*

requests processed in the read stream is one of the plurality of factors used to select

the amount of readahead data (col. 4, lines 53-67)].

28.   As to claim 63, Permut further discloses *wherein the number of client read*

requests processed in the read stream is stored as a count value in a readset data

structure associated with the read stream [Figure 2, #208].

29.   As to claims 70 and 72, Permut discloses *allocating more readsets for the file in*

response to processing one or more write requests to the file (since any writes involve

more data which will introduce new read requests with new hints corresponding

thereto).

Allowable Subject Matter

30.   Claims 1-15 and 30-33 are allowed.

Conclusion

31.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Gary J. Portka whose telephone number is (571) 272-

4211. The examiner can normally be reached on M-F 9:30 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Hyung Sough can be reached on (571) 272-6799. The fax phone number

for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

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Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Gary J Portka/
Primary Examiner, Art Unit 2188
May 22, 2009